Moving Towards Improved Fossil Fuel Emission Inventories for the Carbon Cycle

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Monthly energy statistics for fossil fuel production and use have been compiled by the International Energy Agency since the early 1970s on a per country or region basis. Until recently however, national and global fossil fuel emissions inventories were built on an annual basis only. Blasing *et al.* [2005] have derived a 21 year-long time-series of monthly USA CO_2 emissions based on the US DOE/Energy Information Administration energy statistics reports. They showed that the national emissions due to natural gas have a pronounced annual cycle, emissions due to coal exhibit a double peak (one in summer and one in winter) and emissions related to liquid fuels have no significant seasonality. To study the carbon cycle at finer temporal and spatial scales, one needs to take into account the fossil fuel emissions variability on hourly, to seasonal, to inter-annual time scales. We are developing a 1x1 degree map of the USA CO2 fossil fuel emissions with varying time resolution: hourly to monthly. For this we rely on the EPA CEMS data for power plants emissions and on EPA/MOBILE 6 and DOE/EIA for other sources such as transportation, residential and industrial use of fossil fuels. We will first investigate the impact of the derived time-varying emissions on the simulated CO2 distribution and then perform high resolution inverse modeling studies with the improved fossil fuel emissions.

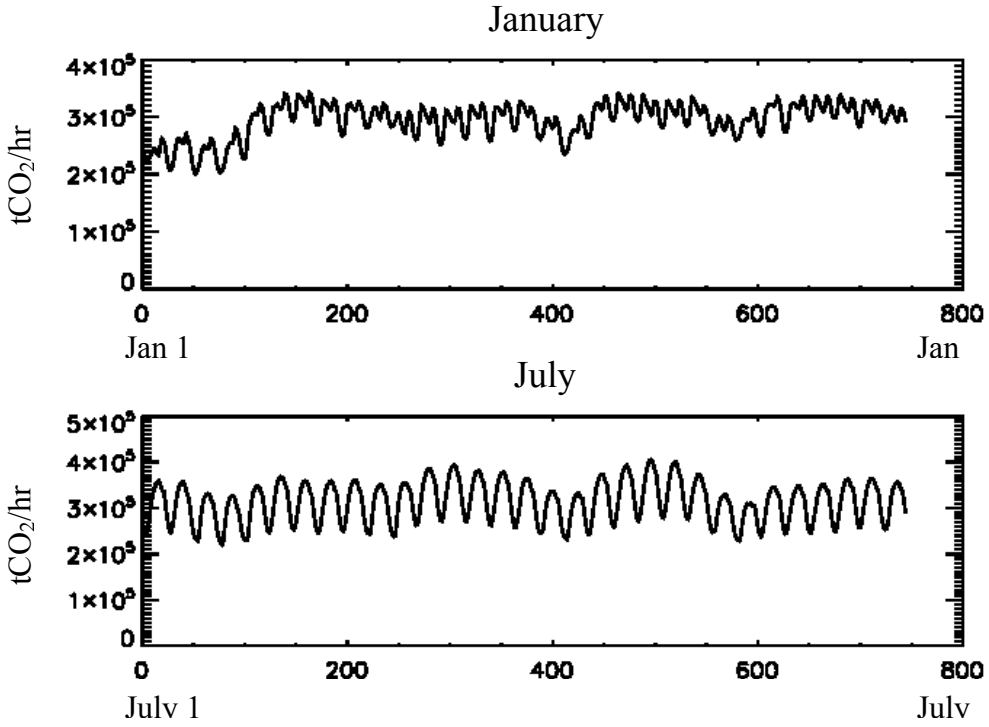

Figure 1. Hourly EPA/CEMS CO2 emissions (tCO2/hr) for January 2004 (top) and July 2004 (bottom) used to drive the fossil fuel emissions 1x1 degree map model.